say nothing. Like *Cordaites* it has some analogy to the *Cycadæ*, the Conifers and the Monocotyledonous, the Glumaceæ. But it is evident from the character of its leaves, some of which are narrowed to the point of attachment, that this species is in relation to the groups of the *Tænophyllum*, as also by its nervation to the *Cordaites*.

There is in the stem a peculiar character, which should be remarked. It rather appears to have been soft than of hard texture. The bark is so thin that by erosion some of the scales and young leaves are left attached to the lower surface of the stem as seen in the upper part of Pl. LV, fig. 1. On another side large leaves, especially seen upon my specimens, are decurring at the base along the stem, and seen to join it by a division of its borders, or come to it in a more or less open angle of divergence without any diminution of their width, and without apparent division in their point of union, just as if they were part of the stem. The epidermis of the leaves is also thin, its surface reflects the largest nervation buried in the texture, which then appears obtuse, distant as in figure 2 of Brongniart, but under the epidermis, these primary veins are less discernible, sometimes totally unobservable, the intermediate very thin vinelets covering the whole surface.

Habitat. These remarkable specimens, which if they do not throw light upon the relation of this plant to those of our time, give at least indication of their reference to the family of the *Cordaites*, have been found and communicated by Dr. J. H. Britts, from the Clinton coal of Missouri.

The Columella and Stapes in some North American Turtles.

By Sarah P. Monks.

(*Read before the American Philosophical Society March* 1, 1878.)

The columella is a small bone found in most reptiles which extends from the parietal to the pterygoid, and helps to complete the lateral wall of the cranium.*

In *Lacertilia* it is a distinct, slender rod "in close contact with the other cranial bones at its extremities only.

In *Testudinata* on the other hand it is broad, short and scale-like, and closely articulated with other bones.†

It varies considerably in the different species and families, and in some seems to be wanting.

In nearly all turtles there is a strongly marked ridge extending forward from the quadrate to the top of the skull, and another not so distinct from the pterygoid backward to the same point on the top of the skull.

*See Professor Cope "On the Homologies of some of the Cranial Bones of the Reptilia, and on the Systematic Arrangement of the Class."

†Proceedings of Association for the Advancement of Science, 1870, Vol. XIX, pp. 223, 224, and Professor Huxley's Anatomy of Vertebrate Animals, 1872, p. 189.

The columella forms part of these ridges and occupies a space between them.

Its primitive shape, as indicated by young specimens, and nearly adult sea forms, is an open triangle, or, perhaps, two rods of bone touching at one end, but wide apart at the base. (From young *T. carolina.*)

In some species the triangular form is lost, and in most it becomes very much flattened in adult age.

It articulates above with the parietal, below with the pterygoids, in front with the parietal and sometimes the jugal, behind with the parietal and quadrate, and often forms part of the anterior margin of the foramen ovale.

From the quadrate there extends a small osseous style to meet it, and in most cases there is a groove in the pterygoids anteriorly for its cartilaginous extension to reach the jugal.

The descending plate of the parietal generally articulates directly with the pterygoid in front, but the columella is between them at other points.*

The columella in *Chelonia mydas* is triangular, with the front portion scale-like, but the back a flattened rod where it joins the quadrate.

In young specimens it is small and slender, and is placed on the base of the parietal near the centre, in a deep groove. It does not touch the jugal nor extend to the foramen ovale in the young.

In *Aspidonictes spinifer* it is thin, flat and scale-like, and either a continuation of it or a separate bone, extends forward, and is interposed between the parietal and pterygoid. It forms the margin of the foramen ovale, which, like all openings in the Trionyx skull is very large.

Aromochelys odoratus makes a second exception to the general rule in specimens I have examined of the parietal reaching the pterygoids in front.

In this case and in *A. spinifer* there are two bones to complete the lateral wall. Instead of curving upward, as in other species, they curve downward, and the anterior portion, or bone, if it proves to be separate, is firmly attached to the palate bone in adults. In one specimen this front part forms a complete column, whose hinder margin blends with the flat bone.

The columella is flat even where it joins the quadrate and bounds the greater part of the front of the foramen ovale.

In *Chelydra serpentina* it forms a flattened, concave triangle, and is joined to the quadrate, and often the jugal by two flattened rods. It is large, well marked, and bounds the foramen ovale.

In *Malacoclemmys palustris* it is a narrow band, deeply concave, extending from the inward process of the jugal to the quadrate, and forms part of the ridge in front of the foramen ovale.

In *Pseudemys scabra* and *Ps. concinna*, it is much as in *M. palustris*, but in *Chrysemys picta*, *Chelopus guttatus*, *Chelopus muhlenbergii*, and *insculptus*, and *Cistudo clausa* it is much smaller, and does not extend to the jugal. In all these emydes the posterior descending portion of the parietal forms the most of the ridge in front of the foramen ovale.

*See Fig. 9. Ch. serpentina of Professor Cope's articles on "Homologies of Cranial Bones of Reptilia."